201-31C10/J02-PG

UNITED STATES ARMY SIGNAL CENTER AND FORT GORDON
FORT GORDON, GEORGIA 30905

PERFORMANCE GUIDE

NEWARK PUBLIC LIBRARY
AUG 19 1985
U. S. GOVT. PUBS.
DEPOSITORY 326

GENERATOR SET 5 KW AC

201-31C10/J02-PG

ACAD DEPT APPROVED: 18 JUN 84
STAFF PROPONENT: JK

This document supports Task Numbers 113-601-1001 and 113-601-2001.

This document supersedes Performance Guide 201-31C10/J02-PG, 14 Feb 84.

GENERATOR SET 5 KW AC

INTRODUCTION:

1. To become a competent radio operator, you must learn how to use a wide variety of equipment. One of the key items is the generator, your power source.

2. This instructional document is designed to teach you how to use one of the very popular and common generators in the Army, today. This generator is the PU-620. Specifically, this lesson will teach you how to install and operate the Generator Set PU-620 with Radioteletype Set AN/GRC-122/144.

3. When you have completed this lesson, you will be able to install the ground, connect the power cable, perform before operation checks, start the generator set electrically, perform during operation checks, adjust for proper voltage and cycle operation, stop the generator set, start the set manually, use emergency stopping procedures, and perform after operation checks within a 20 minute time frame.

ITEMS YOU WILL NEED FOR THIS LESSON:

Check your work area and make sure you have the following items. If any item is missing, call your instructor.

a. Generator PU-620.

b. TM 5-6115-332-14.

c. TM 5-5805-258-14.

d. TB 43-0125.

THE LESSON STRATEGY:

This lesson is divided into 10 instructional units. By doing this, you will find learning how to operate the generator set is quite easy. In the first two units, you will learn to install the ground system and connect the power cable. The third and fourth units will teach you to perform before operation checks and start the generator set electrically. Your fifth and sixth steps will

Whenever pronouns or other references denoting gender appear in this document, they are written to refer to either male or female unless otherwise indicated.

be to perform during operation checks and adjust for proper voltage and cycle operations. In the next three units, you will learn to stop the generator set, start the set manually, and use emergency stopping procedures.

APPLICATION:

1. Description. Generator Set PU-620 consists of two 5 kw, 120/240-volt alternating current (AC) gasoline operated generators mounted on a 3/4 ton two-wheel cargo trailer. Each generator is powered by a two-cylinder air cooled engine that is rated at 10 horse power and is capable of producing 5,000 watts of power in the 120- to 240-volt range at 60 hertz.

a. In order for you to have a better understanding of the equipment, figure 1 shows a left rear three-quarter closeup view of a single generator. Figure 2 shows a right front three-quarter view. Both figures define important items of interest to you as an operator.

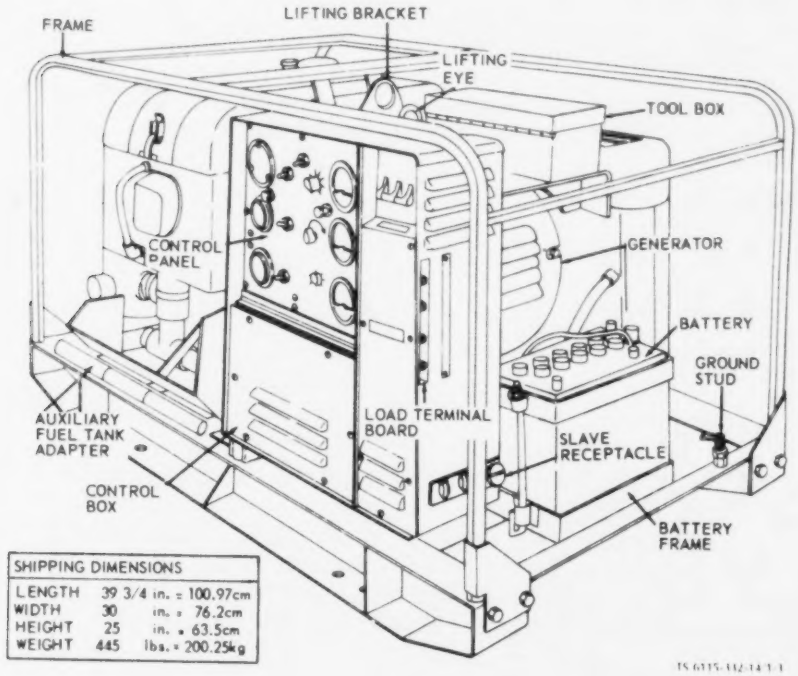


Figure 1

b. Figure 3 shows a top view of both generators and supporting equipment as they are mounted for use.

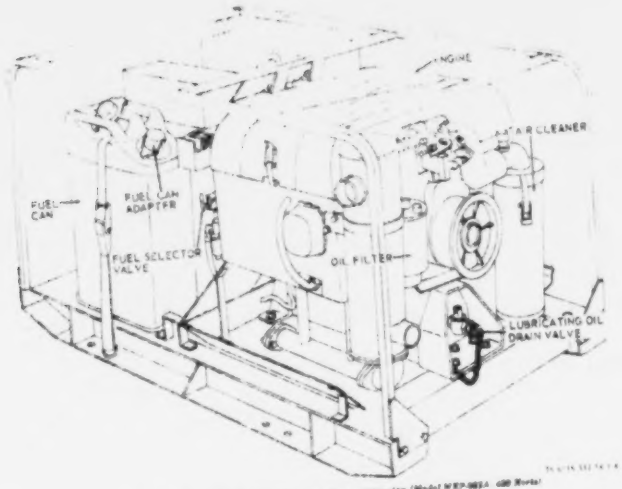


Figure 2

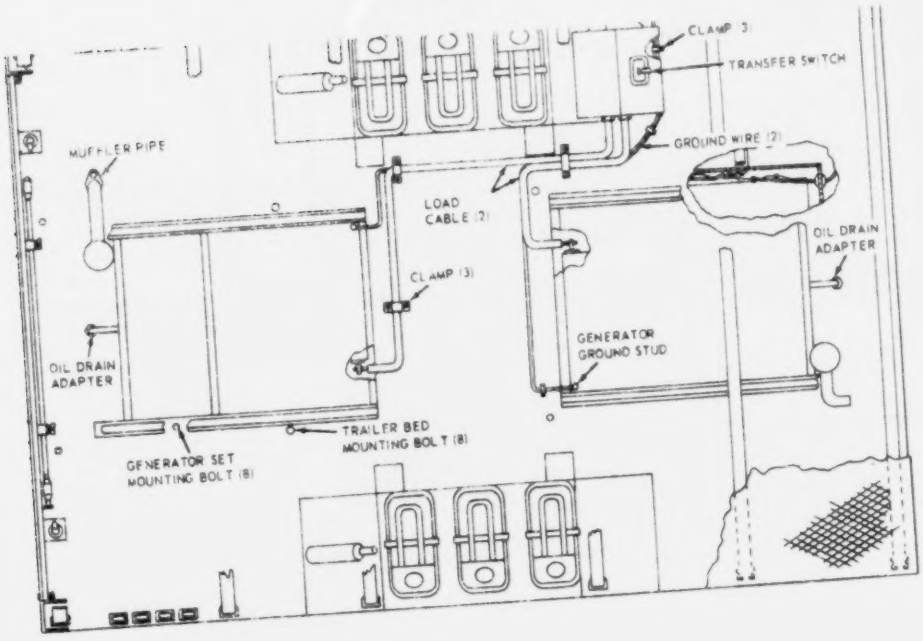


Figure 3

2. A very important feature of the PU-620 is the GENERATOR TRANSFER switch which allows the operator to switch from one generator to the other without loss of power.

SELF-EVALUATION:

3. Answer the following questions:

a. A PU-620 consists of: _____.

(1) an AN/GRC-122 mounted on a truck.

(2) two 5 KW Generators mounted on a trailer.

(3) a 5 KW and a 10 KW Generator.

b. The power output of each generator is _____.

(1) 5,000 watts.

(2) 10,000 watts.

(3) 1,000 watts.

c. The voltage range of each generator is _____.

(1) 120/240 volts DC.

(2) 120/240/380 volts AC.

(3) 120/240 volts AC.

d. The GENERATOR TRANSFER switch allows the operator to _____.

(1) run both generators at the same time.

(2) switch from one generator to the other without loss of power.

(3) transfer power from one generator to the other.

e. Check your answers.

a. (2) b. (1) c. (3) d. (2)

4. Installation.

a. Leveling.

(1) Locate the trailer on a level surface where possible. This will enable the generators to operate more efficiently.

(2) Unhitch the trailer, set the brakes, and block the wheels to prevent any movement.

(3) Pull the leg support down and adjust the length for firm contact with the ground.

b. Preparation for starting.

(1) Roll up tarpaulin and remove splash shield as shown in figure 4.

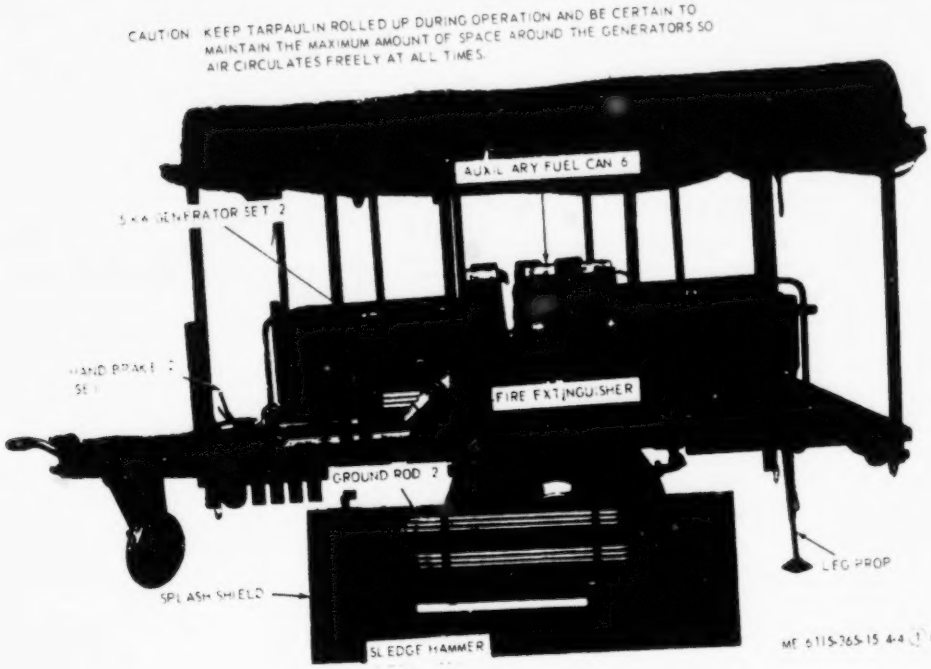


Figure 4

(2) Remove all loose items and anything else that might block the free circulation of air through the trailer and around the generator sets.

(3) Inform your instructor you are ready to connect the power cable from the equipment shelter to the generator. You will connect the cable to the GENERATOR TRANSFER switch as shown in figure 5.

(4) Remove the auxiliary fuel cans from the trailer.

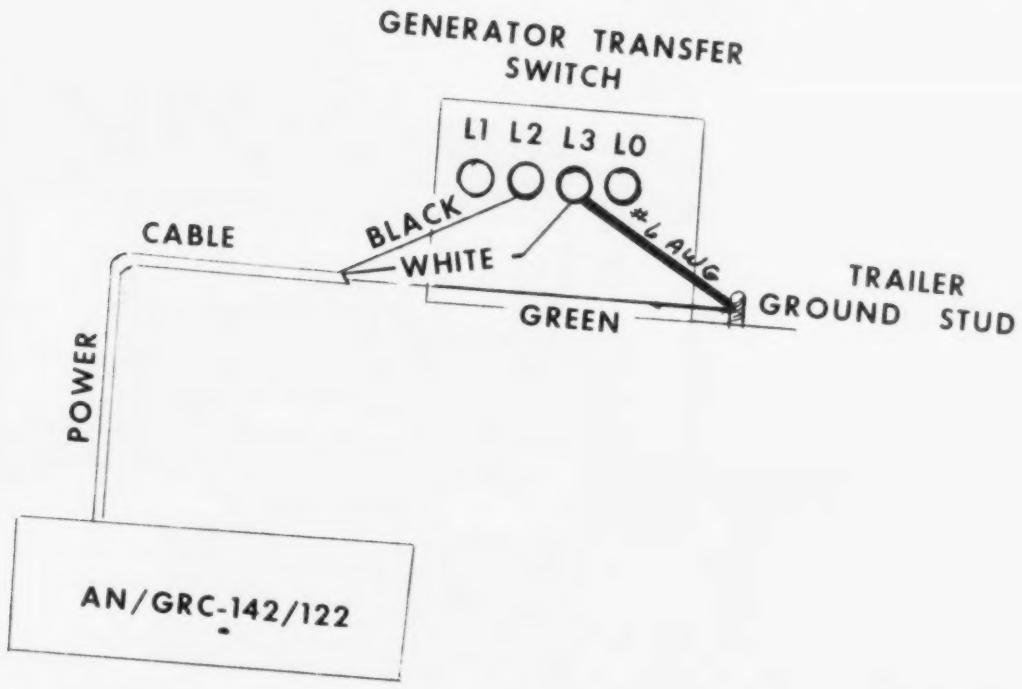


Figure 5

c. Grounding.

(1) To avoid shock hazard, the generator set must be grounded prior to operation. This can be accomplished by driving the ground rod provided into the ground to a depth of 8 feet.

(2) The ground lead must be number 6 AWG copper wire or equivalent and must be bolted or clamped to the rod. The other end must be connected to the generator ground stud, as shown in figure 6.

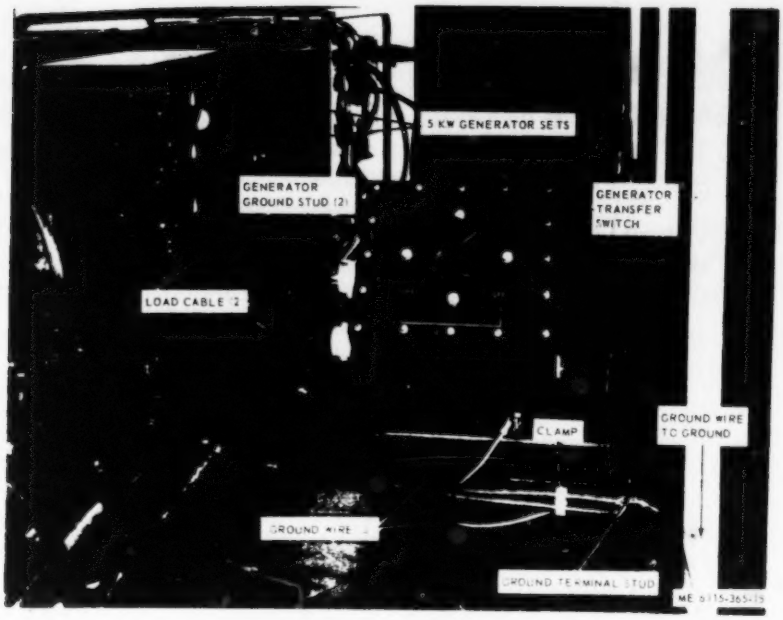


Figure 6

(3) For other types of grounds that can be used, see paragraph 4-3, TM 5-6115-365-15.

5. Answer the following questions:

a. The generator set must be grounded before operation in order to _____.

(1) operate properly.

(2) be economical on fuel.

(3) avoid shock hazard.

(4) make less noise.

b. The ground rod should be driven to a depth of _____.

(1) 4 feet.

(2) 6 feet.

(3) 9 feet.

(4) 8 feet.

c. The proper connection for the power cable at the GENERATOR TRANSFER switch for 120-volt single phase is _____.

(1) black to L-4, white to L-3, green to L-0.

(2) black to L-2, white to L-3, green to trailer ground stud.

(3) black to L-3, white to L-2, green to L-0.

(4) green to L-3, black to L-2, white to L-0.

d. How many fuel hoses can be connected to each generator at one time? _____.

(1) One.

(2) Three.

(3) Two.

(4) Four.

e. Check your answers:

a. (3) b. (4) c. (2) d. (3)

6. Operation.

a. Starting procedures.

(1) Preoperational checks.

(a) Add fuel as needed.

(b) Inspect ground terminals.

(c) Inspect battery and cables.

1. Tighten loose connections.

2. Remove corrosion.

3. Check for cracks and leaks.

4. Fill cells as needed.

5. Clear vent holes.

(d) Check crankcase level, add oil as needed.

(e) Place circuit breaker OFF.

(f) Place TRANSFER LOAD switch in desired position.

(2) Starting.

(a) For local starting, complete the following steps:

1. Place fuel selector valve in TANK or AUXILIARY position (figure 7).

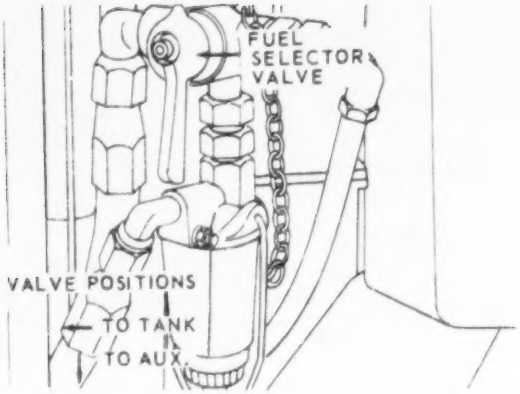


Figure 7

2. Place the oil pan baffle rod in the proper position depending on temperature (figure 8).

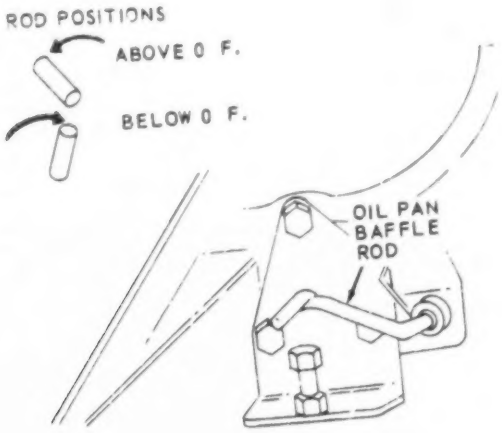


Figure 8

3. Place air cleaner intake shutter in the proper position depending on temperature (figure 9).

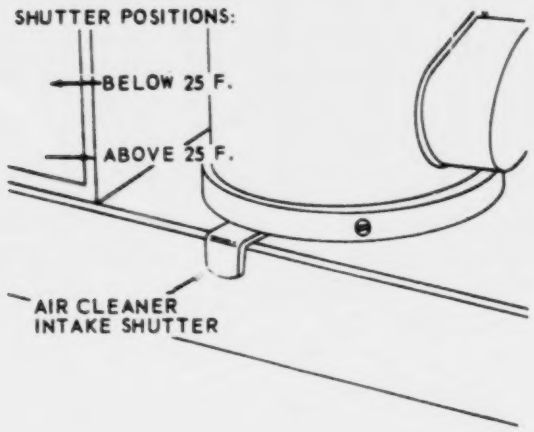


Figure 9

4. Position GOVERNOR control in to full GOVERNOR position (figure 10).

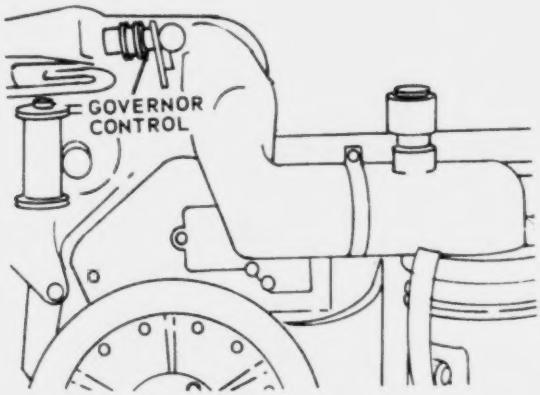


Figure 10

5. Place REMOTE-LOCAL switch in LOCAL position.

6. Place RUN-STOP switch in NORMAL position.

7. Hold START-STOP switch in START position until engine starts (figure 11).

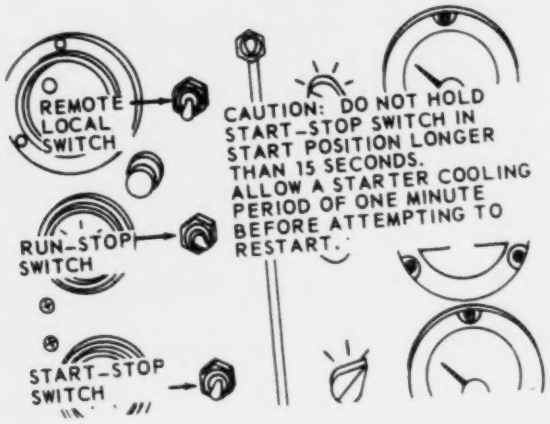


Figure 11

8. Adjust CHOKE control as necessary.

9. Leave GOVERNOR control in FULL GOVERNOR position and allow 3 minute warmup (figure 12).

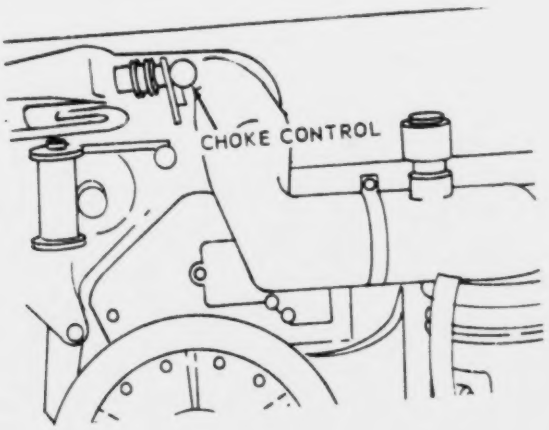


Figure 12

(b) For manual and remote starting procedures, refer to TM 5-6115-332-14.

b. Operating procedures. (Refer to figure 13.)

(1) During operation checks.

(a) Inspect for damage and loose mountings.

(b) Check instruments, normal readings are:

1. Ammeter should read on plus side of scale.

2. Oil pressure gauge should read 20 to 60 PSI (pounds per square inch).

3. Frequency meter should read 60 hertz.

(2) Operation.

(a) If frequency meter does not read 60 hertz, adjust GOVERNOR control.

(b) Turn voltage adjust to 120 volts.

(c) Place circuit breaker on.

(d) Readjust voltage.

(e) Place the AMMETER PHASE SELECTOR switch in each position. Meter should read below 100%.

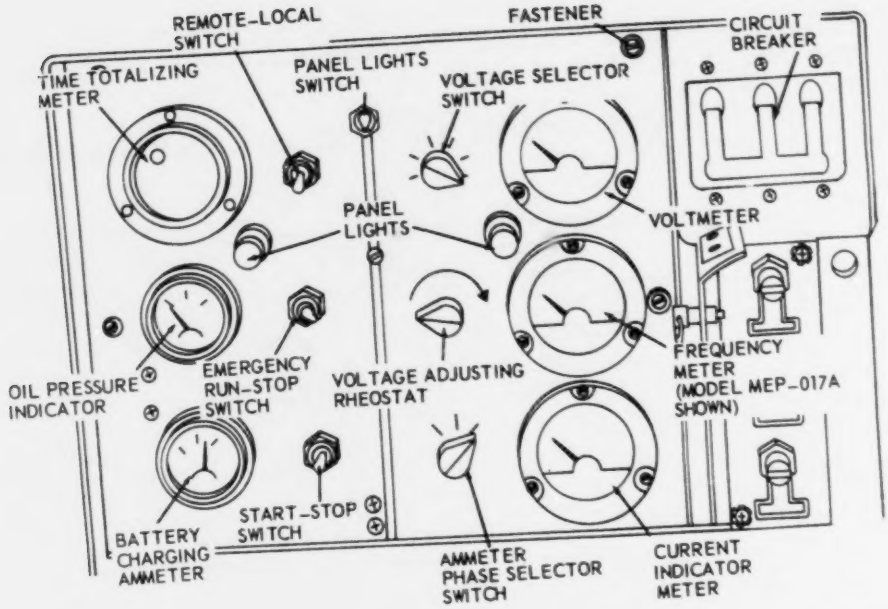


Figure 13

c. Stopping procedures.

(1) Stopping.

(a) For local stopping, complete the following procedures:

1. Place circuit breaker in OFF position (figure 14).

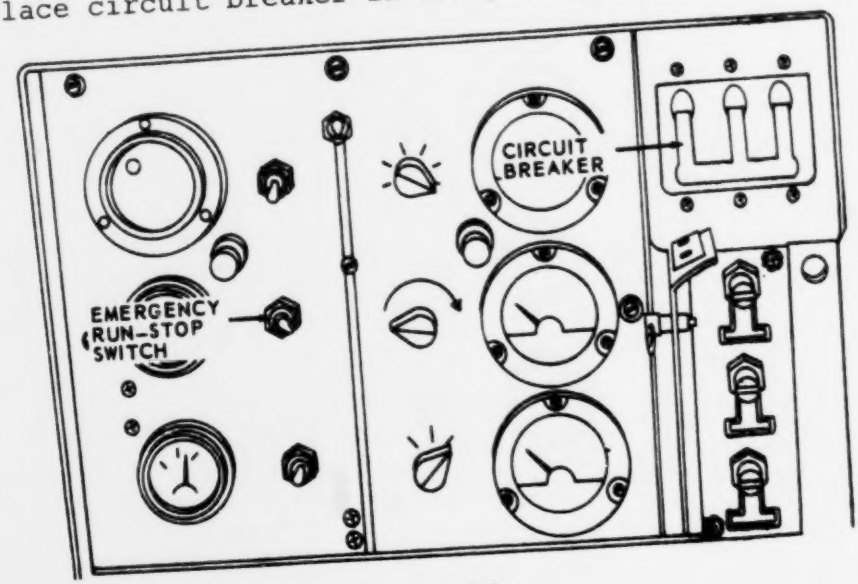


Figure 14

2. Leave GOVERNOR control in full GOVERNOR position and allow to run for 3 minutes.

3. Place GOVERNOR control in START and IDLE position (figure 15).

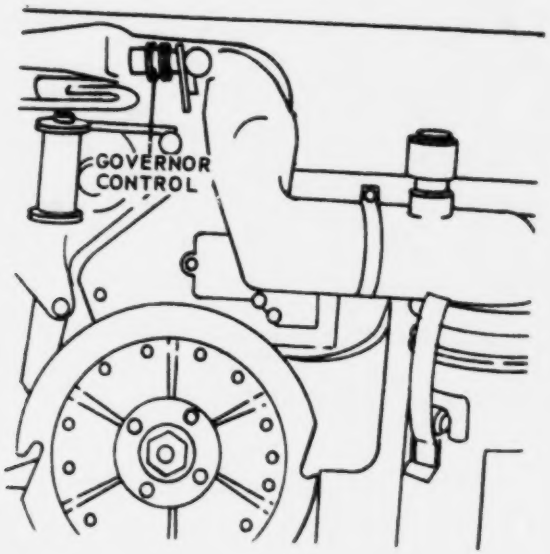


Figure 15

4. Place START-STOP switch in STOP position (figure 16).

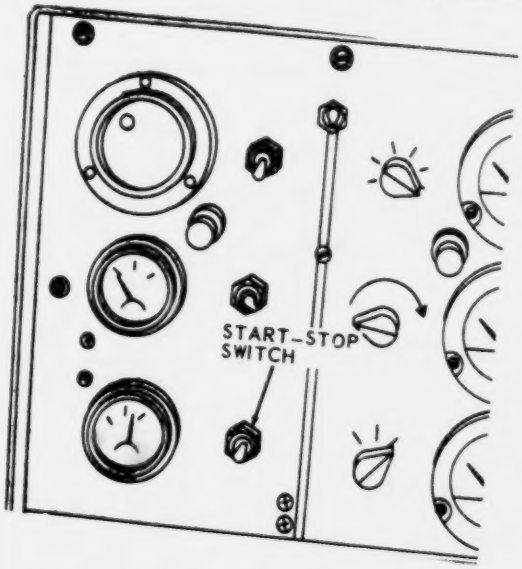
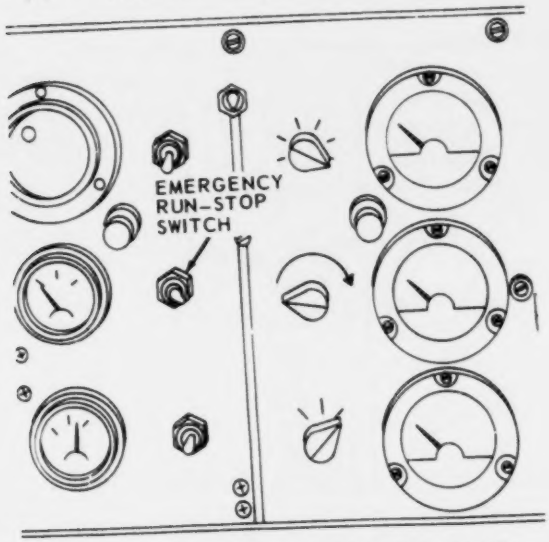


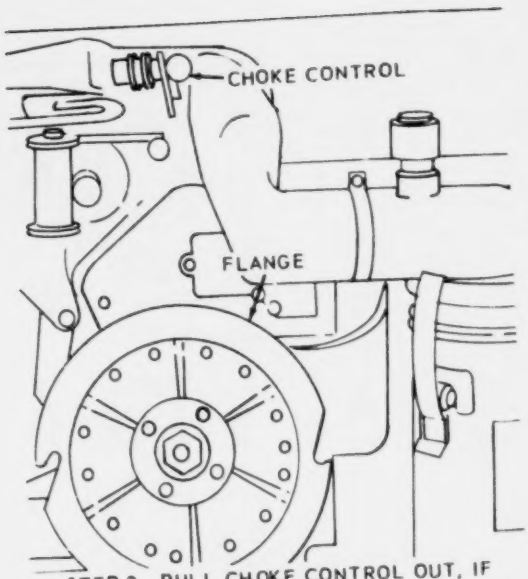
Figure 16

7. Manual Starting Procedures.



STEP 1. PLACE EMERGENCY RUN-STOP SWITCH EMERGENCY RUN POSITION.

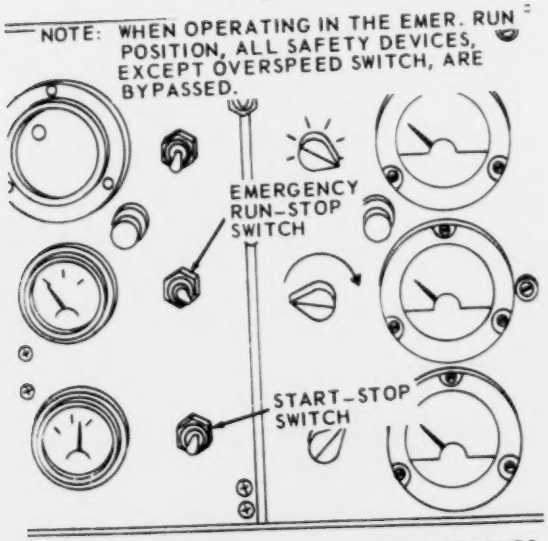
Figure 17



STEP 2. PULL CHOKE CONTROL OUT, IF ENGINE IS COLD.

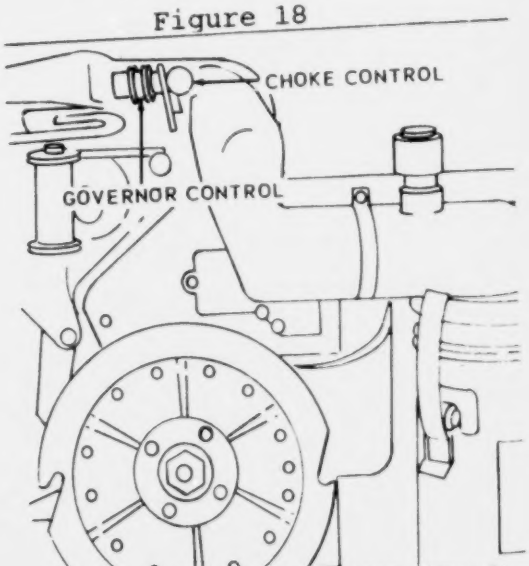
STEP 3. WRAP STARTER ROPE ON FLANGE AND PULL WITH QUICK STEADY MOTION. REPEAT AS NECESSARY UNTIL ENGINE STARTS.

Figure 18



STEP 4. WHEN ENGINE OIL PRESSURE REACHES OPERATING PRESSURE, PLACE EMERGENCY RUN-STOP SWITCH IN NORMAL POSITION, AND AT THE SAME TIME MOMENTARILY PLACE START-STOP SWITCH IN START POSITION.

Figure 19



STEP 5. GRADUALLY PUSH CHOKE CONTROL IN AS ENGINE REACHES OPERATING TEMPERATURE.

STEP 6. POSITION GOVERNOR CONTROL IN APPROXIMATELY ONE FOURTH SPEED POSITION AND ALLOW ENGINE TO WARM FOR FIFTEEN MINUTES

Figure 20

8. Emergency Stopping Procedures.

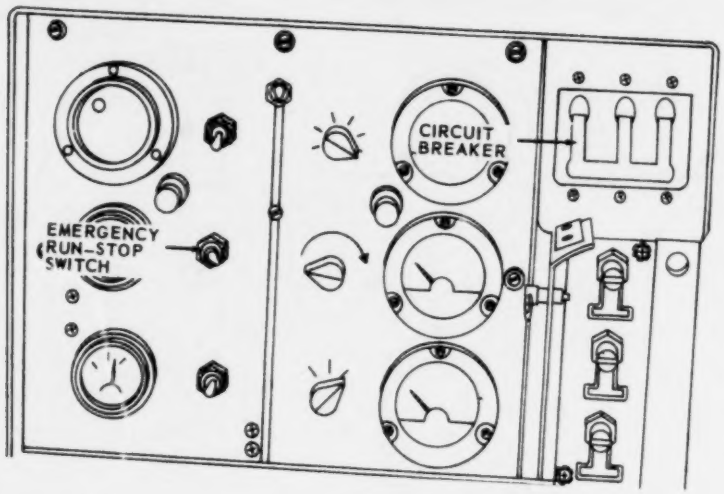


Figure 21

a. For emergency stop, position RUN-STOP in EMERGENCY STOP position (figure 21).

LINE-UP SEQUENCE FOR THE 5 KW GENERATOR

The following is a list of procedures to be performed for safe operation of the Generator Set 5 KW. These procedures will be followed when practicing on the generator set. These procedures will also be performed during your practical exercise.

1. Before Operational Checks:

   a. Check ground.

   b. Circuit breaker OFF.

   c. Check batteries.

   d. Check airflow obstruction at blower cover.

   e. Check ventilation.

   f. Check fuel supply.

   g. Check oil level.

   h. Check RESTRICTION indicator.

   i. Check fire extinguisher.

   j. Visual inspection.

2. Presets:

a.	Fuel selector valve	Tank or Aux
b.	Oil pan baffle rod	Summer or Winter
c.	GOVERNOR control	START (full GOVERNOR)
d.	Air cleaner intake valve	Summer or Winter
e.	Ammeter phase selector	I-2
f.	Voltage adjustment rheostat	Fully counterclockwise
g.	VOLTAGE SELECTOR switch	V 2-3
h.	REMOTE-LOCAL switch	LOCAL
i.	EMERGENCY RUN-STOP switch	NORMAL
j.	Circuit breaker	OFF

k.	GENERATOR TRANSFER switch	OFF (located on generator trailer)
3.	Starting Procedures:	
a.	START-STOP switch to START	Hold until 20 PSI reading on oil pressure gauge
b.	CAUTION: Do NOT exceed 15 seconds cranking time!	
c.	Allow starter motor to cool 1 minute before restarting.	
d.	Choke if necessary.	
e.	Leave GOVERNOR control in full GOVERNOR position	Allow 3 minute warm-up
f.	Check RESTRICTION indicator	Not showing in red
g.	GOVERNOR control	Full GOVERNOR
4.	During Operational Checks:	
a.	Oil pressure	20-60 PSI
b.	Battery charging ammeter	+ side of zero
c.	Frequency meter	59 - 61 Hertz
d.	Adjust voltage	120 volts
e.	Circuit breaker	ON
f.	TRANSFER switch	ON (TRANSFER switch is mounted on trailer)
g.	Readjust voltage	120 volts
h.	Check CURRENT indicator	Less than 100% output
i.	Visual inspection	Unusual noises, leaks, etc.
5.	Shutdown Procedures:	
a.	TRANSFER switch	OFF
b.	Circuit breaker	OFF

c.	Voltage adjust rheostat	Fully counterclockwise
d.	GOVERNOR control	Leave at full GOVERNOR
e.	3 minute cool down	
f.	START-STOP switch	STOP, hold down until generator stops completely
g.	EMERGENCY RUN-STOP switch	STOP
h.	Fuel selector	OFF

6. After Operational Checks:

   a. Check oil.

   b. Check fuel.

   c. Check battery.

   d. Visual inspection.

ABBREVIATED PROCEDURES FOR STARTING, OPERATING, AND STOPPING GENERATOR SET PU-620

CONTROL	STARTING & PURPOSE	POSITION
Fuel Selector Valve	To turn fuel off or to select between unit or external supply	TANK
Oil Pan Baffle Rod	Controls flow of air to oil pan	Per temperature
Air Cleaner Intake Shutter	Provides preheated air to carburetor	Per temperature
GOVERNOR Control	Controls speed of engine	START and IDLE
REMOTE-LOCAL Switch	Switches unit into local or remote operation	LOCAL
RUN-STOP Switch	Engages engine safety controls and emergency stopping	NORMAL
START-STOP Switch	Starts or stops engine in local mode	START (No longer than 15 seconds)
CHOKE Control	Chokes engine during cold start	ADJUST
GOVERNOR Control	Controls speed of engine	Leave at full GOVERNOR
	OPERATING	
GOVERNOR Control	Adjusts hertz on frequency meter	As needed for 60 hertz
Voltage Adjust Rheostat	Increases or decreases voltage	As needed for 120 V AC
Circuit breaker	Connects and disconnects load	ON
Voltage Adjust Rheostat	Increases or decreases voltage	As needed for 120 V AC
AMMETER PHASE SELECTOR Switch	Selects phase desired	All positions in turn

ABBREVIATED PROCEDURES (CONTINUED)

CONTROL	OPERATING	POSITION
VOLTAGE SELECTOR Switch	Select phase winding	All positions in turn
	STOPPING	
Circuit breaker	Connects and disconnects load	OFF
GOVERNOR Control	Controls speed of engine	Leave at full GOVERNOR
GOVERNOR Control	Controls speed of engine	START and IDLE
START-STOP Switch	Starts or stops engine in local mode	STOP

7. After Operation Checks.

a. Inspect unit for:

(1) Cleanliness.

(2) Oil leaks.

(3) Broken or cracked frame.

(4) Missing parts.

b. Correct or report problems to organizational maintenance.

8. Answer the following questions:

a. Adding fuel to the generator is a _____.

(1) preoperation check.

(2) during operation check.

(3) after operation check.

b. Checking the oil level in the crankcase is _____.

(1) during operation check.

(2) preoperation check.

(3) after operation check.

c. During operation, the ammeter should read _____.

(1) on the minus side of the scale.

(2) on the plus side of the scale.

(3) directly in the center of the scale.

d. During operation, the frequency meter should read _____.

(1) 50 hertz.

(2) 70 hertz.

(3) 60 hertz.

e. To adjust for proper frequency an adjustment is made at the _____.

(1) GOVERNOR control.

(2) CHOKE.

(3) fuel selector valve.

f. During operation, oil pressure gauge should read _____.

(1) 120 volts.

(2) 60 hertz.

(3) 20 to 60 PSI.

EVALUATION:

Request the lesson evaluation from your instructor.

PRACTICE:

1. Practice on your own or observe a demonstration of the operation of the PU-620. After the demonstration, or if you decide to continue without the demonstration, continue as directed in item 2.

2. Request practical exercise. After being assigned to a position and given general instructions, practice with abbreviated operating procedures until you can do them in a reasonable amount of time without use of the performance guide.

PERFORMANCE TEST:

1. Notify your instructor when you are ready to take your performance evaluation. Request the lesson evaluation.

2. After being assigned to a position and given instructions, you will have 10 minutes to do the following:

   a. Before operation checks.

   b. Starting.

   c. During operation checks.

   d. Stopping.

   e. After operation checks.

3. Notify your instructor when you have completed your evaluation. If you receive a NO-GO, your instructor will help you correct your errors.

INSTRUCTOR CERTIFICATION

STUDENT IS PREPARED TO PROCEED TO THE NEXT LESSON.

INSTRUCTOR'S SIGNATURE: _____

DATE: _____

SYS END

26

☆ U.S. GOVERNMENT PRINTING OFFICE 1984—746-006/10679